Supplementary testimony for the hearing held by The Subcommittee on Water and Power, Committee on Natural Resources, "Extinction if not sustainable water policy: the Bay-Delta crisis and the implications for California water management." Vallejo, CA. July 2, 2007

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1. In their testimony before the Subcommittee, Mr Steve Thompson (US Fish and Wildlife Service) and Mr. L. Ryan Broddrick (California Department of Fish and Game) indicated that their agencies had done everything in their power to protect the delta smelt, through adaptive management and other means. I respectfully disagree. As I indicated in my verbal testimony, most steps taken to protect the smelt were made only to minimize damage to the population rather than to actually improve conditions (as would seem to be necessary for recovery). Even actions to limit damage seemed to currently be in abeyance given the extremely low numbers of smelt taken in sampling programs and the numbers of smelt taken by the state and federal export pumps. As the result of increasing export of water from the SWP pumps at Tracy, in the two days before the hearing 390 and 258 smelt (data presented by Mr. Johns at the hearing), respectively, were entrained (killed) at the pumps. On the day of the hearing, 311 delta smelt were entrained. Since May 10 of this year nearly 2500 delta smelt have been taken at the pumps. Numbers are certainly higher because only smelt greater than 20 mm long are counted. Actions that could have been taken to protect the smelt this year, but were largely *not* performed were recommended in two letters by myself and Dr. Christina Swanson that were sent to the five agencies directly involved with smelt management on March 14 and June 1, 2007. These recommendations were not original with us but stemmed from recommendations by the agencies' own biologists.

2. Mr. Thompson and Mr. Broderick indicated that changing the status of the delta smelt from Threatened to Endangered, as requested in an emergency petition filed over a year ago (March 8, 2006), would not have affected management of the species. Again, I respectfully disagree. Endangered listing would be dramatic acknowledgement of the critical state of the smelt population, with the potential to mobilize additional resources for protection of the smelt, as well as public support for actions taken. If the smelt was listed as endangered under the federal Endangered Species Act, it is highly likely that the continued mortality of smelt at the SWP pumps not would be allowed to continue.

3. Mr. B. J. Miller presented testimony in which he stated that there is no linear relationship between the amount of exports and delta smelt numbers. He further stated that because of the lack of a relationship, agency and other biologists never show graphs relating exports to smelt numbers even though they claim a relationship exists (i.e., are in denial about the lack of a relationship). There is evidence to the contrary. Attached to this submittal is a graph showing a negative relationship between exports and smelt numbers that was part of the emergency listing petition submitted in 2006. The relationship is weak but present. In any case, a direct relationship is not needed to show

that the pumps in the south Delta can impact smelt populations. In a recently published, peer-reviewed paper (unlike Mr. Miller's analysis), Dr. William Bennett has provided some strong indications that the increase in early season pumping has impacted smelt because it kills the biggest, most fecund smelt (and probably their offspring), which contribute the most to future generations. This is the "big mama" hypothesis mentioned at the hearing. Exports from the Delta are clearly not the only cause of smelt decline but there is every reason to thing they are an important contributing factor, especially when populations are as low as they are today.

4. It is not at all certain that the delta smelt will make it though another year. If it does survive, it will be again in record low numbers. This crisis emphasizes the need not only to take actions to improve conditions for delta smelt as much as possible but to start taking large-scale actions to make sure smelt habitat is present in the future, as suggested in the UCD-PPIC report and indicated in my previous written testimony.

From: Emergency petition to list the delta smelt *(Hypomesus transpacificus)* as an endangered species under the endangered species act, submitted to the U. S. Fish and Wildlife Service by the Center for Biological Diversity, The Bay Institute, and the Natural Resources Defense Council, March 8, 2006

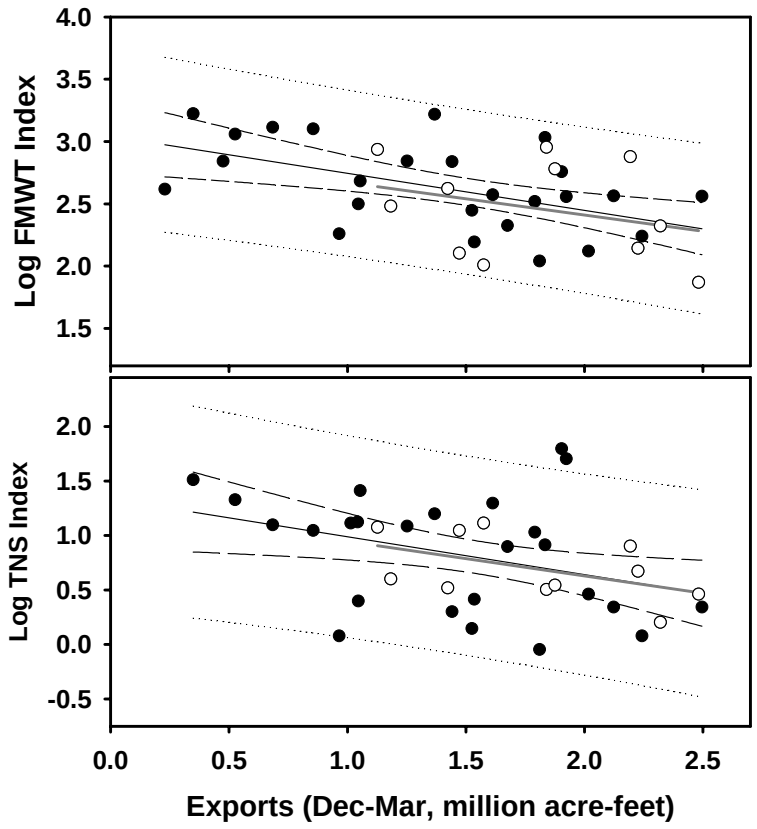

Figure 6. The relationship between winter (December-March) export amounts and subsequent abundance of delta smelt. a) sub-adult and adult delta smelt as measured by the FMWT Index (using data from 1967-2004); and b) juvenile delta smelt as measured by the TNS Index (using data from 1969-2004). For each graph, the regression, 95% confidence limits and the prediction limits are shown calculated for the entire datasets. The open symbols and the dark gray regression line highlight the years since the delta smelt was listed under the ESA (1994-2004). Data Sources: California Department of Fish and Game, California Department of Water Resources, Dayflow.

Large scale ecological changes have occurred in the Delta during the past 30 years, such as the establishment of the invasive clam *Corbula amurensis* and its impacts on the planktonic food web, but they do not strongly affect the results of these types of correlation and regression analyses. For example, the significant relationship between winter exports and the subsequent population abundance of adult delta smelt was apparent in the 20 years prior to the clam's invasion (1967-1985, Equation 5).

Adult delta smelt (1967-1986):

Log FMWT = 3.109 – 0.353(Dec-Mar exports, MAF) **(Equation 5)**

n=18; p=0.013; r^2=0.0329, SEE=0.308

Linear regression using smaller subsets of more recent years (e.g., post-*Corbula* invasion, 1987-2004 or 2005; post-ESA listing, 1994-2004 or 2005) were not statistically significant but both the slopes and intercepts of the relationships were very similar to those generated using the entire dataset (e.g., 1994-2004(5): open symbols and grey regression line in Figure 6). The significant relationship between winter exports and abundance was not "driven" by the low abundances measured during the past three or four years. For example, after excluding the three most recent years for the FMWT abundance indices (2002-2004) from the dataset, the regression was still significant (p=0.02) and the slope and intercept were similar to those generated with the entire dataset. Given that the significant relationship between winter exports and adult abundance was detectable by 2002 (and before), this indicates that the low abundances measured during the past three years, a period during which winter exports were at near record high levels, were predictable as early as three years ago.

The abundance of juvenile delta smelt was also significantly affected by spring-summer exports (March-July). The linear regression for this relationship is:

Log TNS = 1.429 – 0.369(Mar-July exports, MAF) **(Equation 6)**
N=36; p=0.047; r^2=0.111; SEE=0.462

In 1993, the USFWS (1993) identified 21 major federal, state, local or private organization proposals for increased exports. Since that time, Delta water exports and corresponding impacts on delta smelt have increased and they are projected to continue to increase in the future. The recent 5-year review (USFWS 2004b) noted that the potential threat of increased demands on surface water resources in the Central Valley and Delta was growing, citing planned or proposed new water diversion projects such as the Freeport Regional Water Project, increases in pumping capacity at the SWP pumping plant as part of the South Delta Improvement Project, the California Aqueduct/Delta-Mendota Canal inter-tie to allow increased pumping at the CVP pumping plant, Empire Tract on the San Joaquin River; and potential expanded water storage capacity projects at Los Vaqueros, north of the Delta off-stream storage, Shasta Reservoir, in-Delta storage, and south of the Delta surface and groundwater storage projects. The USFWS (2004b) concluded that the increased storage and diversion capacity would likely result in lower freshwater outflows to the estuary, higher water exports from the Delta, and greater entrainment of delta smelt.